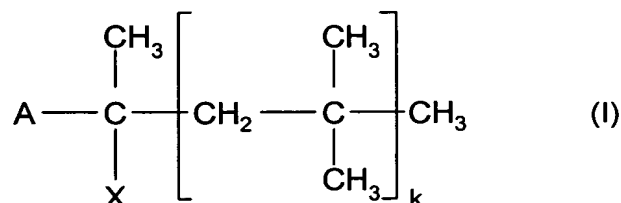


We claim:

1. A process for preparing bifunctional polyisobutenes, which comprises polymerizing isobutene or an isobutene-containing monomer mixture in the presence of a Lewis acid and a compound of the formula I



where

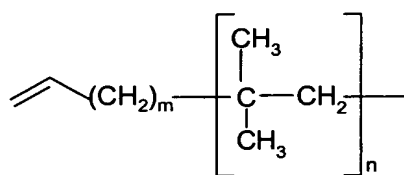
X is halogen, C<sub>1</sub>-C<sub>6</sub>-alkoxy or C<sub>1</sub>-C<sub>6</sub>-acyloxy,

A is an ethylenically unsaturated hydrocarbon radical containing a vinyl group or a cycloalkenyl group, and

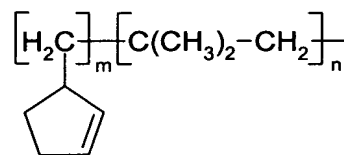
k is from 0 to 5.

2. A process as claimed in claim 1, wherein

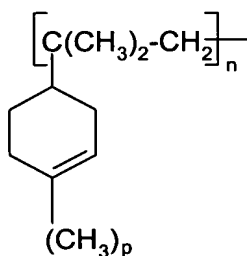
A is a radical of the formulae A.1, A.2 or A.3



A.1



A.2



A.3

where

m is 0 or 1;

n is from 0 to 3 and

p is 0 or 1.

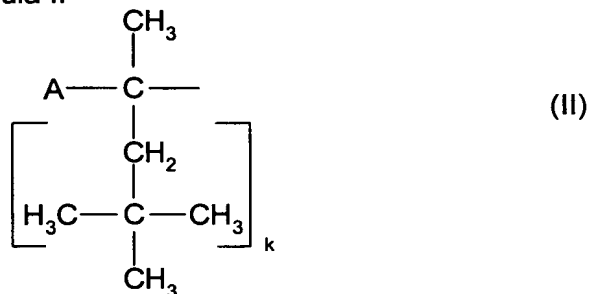
3. A process as claimed in any of the preceding claims, wherein the Lewis acid is selected from among titanium tetrachloride, boron trichloride, tin tetrachloride,

aluminum trichloride, dialkylaluminum chlorides, alkylaluminum dichlorides, vanadium pentachloride, iron trichloride and boron trifluoride.

- 5 4. A process as claimed in any of the preceding claims, wherein the reaction is additionally carried out in the presence of an electron donor.
- 10 5. A process as claimed in claim 4, wherein the electron donor is selected from among pyridines, amides, lactams, ethers, amines, esters, thioethers, sulfoxides, nitriles, phosphines and nonpolymerizable, aprotic organosilicon compounds which bear at least one organic radical bound via oxygen.
- 15 6. A process as claimed in any of the preceding claims, wherein the polymerization is stopped by addition of a protic compound.
- 20 7. A process as claimed in claim 6, wherein the product obtained by stopping the polymerization by means of a protic compound is subsequently treated thermally or with a base.
- 25 8. A process as claimed in any of the preceding claims, wherein the living polyisobutene formed in the polymerization of isobutene or of the isobutene-containing monomer mixture is reacted with at least one comonomer before the polymerization is stopped.
- 30 9. A process as claimed in any of the preceding claims, wherein the living polyisobutene formed in the polymerization of isobutene or of the isobutene-containing monomer mixture is reacted with a conjugated diene before the polymerization is stopped.
- 35 10. A process as claimed in any of claims 1 to 5, wherein the living polyisobutene formed in the polymerization of isobutene or of the isobutene-containing monomer mixture is reacted with a trialkylallylsilane compound or 1,1-diphenylethene together with a base.
- 40 11. A process as claimed in any of claims 1 to 5, wherein the living polyisobutene formed in the polymerization of isobutene or of the isobutene-containing monomer mixture is reacted with a coupling agent so that two or more polymer chains are joined together via their distal end.
12. A process as claimed in claim 11, wherein the coupling agent is selected from among
  - i) compounds having at least two 5-membered heterocycles containing a heteroatom selected from among oxygen, sulfur and nitrogen,
  - ii) compounds having at least two trialkylsilyl groups in allylic positions, and

iii) compounds having at least two vinylidene groups conjugated with two aromatic rings.

13. A polyisobutene which is terminated at at least one end of the molecule by a group of the formula II

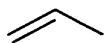


where A and k are as defined in claim 1 or 2,

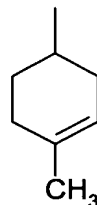
or a functionalization product thereof which is obtainable by

- i) hydrosilylation,
- ii) hydrosulfurization,
- iii) electrophilic substitution on aromatics,
- iv) epoxidation and, if desired, reaction with nucleophiles,
- v) hydroboration and, if desired, oxidative cleavage,
- vi) reaction with an enophile in an ene reaction,
- vii) addition of halogens or hydrogen halides or
- viii) hydroformylation.

14. A polyisobutene as claimed in claim 13, wherein A is selected from among groups of the formulae A.1.1 and A.3.1



A.1.1



A.3.1